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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/671,707 | 09/29/2003 | Rathindra DasGupta | 87324.1780 | 9258 |

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EXAMINER

TRAN, LEN

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| ART UNIT | PAPER NUMBER |
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1725

DATE MAILED: 09/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 10/671,707 | Applicant(s) DASGUPTA ET AL. | |
| | Examiner Len Tran | Art Unit 1725 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,7-10 and 21-43 is/are pending in the application.
- 4a) Of the above claim(s) 27-43 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,7-10,21-23,25 and 26 is/are rejected.
- 7) ☒ Claim(s) 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/29/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>6/7/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-5, 7-10, and 21-26, drawn to a method, classified in class 164, subclass 113.
 - II. Claims 27-43, drawn to an article, classified in class 420, subclass 534.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product can be made by hot rolling.
3. Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with Mr. Phong Nguyen on June 15, 2004 a provisional election was made with traverse to prosecute the invention of group I, claims 1-5, 7-10, and 21-26. Affirmation of this election must be made by applicant in replying to this Office action. Claims 27-43 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

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5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Specification

The disclosure is objected to because of the following informalities: In page 8, 2nd paragraph, the cavities 108, runner 202, and chamber 146 are not shown in the drawings as indicated.

Appropriate correction is required.

Drawings

6. The drawings are objected to under 37 CFR 1.83(a) because they fail to show the cavities (108), runner (202), and chamber (146) as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an

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amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

7. Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claim 21, the term "liquidus temperture" is unclear and vague, since applicant's detailed description in page 10, 2nd and 3rd paragraph, is in contradiction of each other. Applicant explains that the cast is heated 10 to 15 degrees C above the "liquidus temperature". However, applicant in parenthesis indicates that the "liquidus temperature" is the "semi-solid temperature". If the cast is heated above 10 to 15 degrees C above the liquidus temperature, then the metal cannot be in a semi-solid state. In addition, the melting point of AA 380 is between

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520 to 590 degrees C as obtained by Examiner in the Metal Casting Handbook, page 490 (aluminum and aluminum alloys). Therefore, anything above 590 degrees C is considered liquidus. However, applicant indicates in page 10, 3rd paragraph that the cast is heated between 585 to 590 degrees C. In light of the above explanation, the term “liquidus temperature” should be revised as – Solidus Temperature – as understood by examiner.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

9. Claims 1, 2, 5, and 8-10 are rejected under 35 U.S.C. 102(a) as being anticipated by “SLC, A Novel New and Economical Approach to Semi Solid Metal (SSM) Casting” Thieman et al.

As to claim 1, Thieman et al disclose a semi-solid metal (SSM) casting comprising the steps of providing a vertical indexing die casting machine. The process of Thieman et al would inherently heats the metal to a first temperature, and cooling the metal to a second temperature to form a semi-solid metal based on an index time, and casting the semi-solid metal in the vertical indexing die casting machine.

As to claim 2 and 5, the metal is an Al-Si (AA 380 alloy) (page 1, 2nd paragraph).

As to claim 8, the indexing time is the time that a shot sleeve indexes between a pour station and a transfer station (page 5, 1st paragraph).

As to claim 9, the first temperature is the temperature that the metal will form a semi-solid as it cools from indexing between the pour station to the transfer station (page 5, 1st paragraph).

As to claim 10, the indexing time is chosen to achieve a determined rate of cooling so that the metal reaches a SSM range (page 5 and 7).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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12. Claims 3, 4, 21-23, 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over “SLC, A Novel New and Economical Approach to Semi Solid Metal (SSM) Casting)” Thieman et al as applied to claim 1 above, and further in view of Bergsma (US 5,911,843).

As to claims 3 and 4, Thieman et al disclose the claimed invention above, but do not explicitly disclose the used of a hypereutectic and a hypoeutectic alloy.

However, Bergsma discloses the method of producing a semi-solid aluminum alloy, both hypoeutectic and hypereutectic (col. 6, lines 24-47), since both of these aluminum alloys are capable of changing from a dendritic structure to a globular, or spheroidal microstructure and avoiding a further method of using large additions of grain refiners (col. 4, lines 52-56).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of applicant's invention was made to combine both hypoeutectic and hypereutectic alloy as taught by Bergsma with the semi-solid casting method of Thieman et al in order to avoid using of grain refiners. In addition, both hypereutectic and hypoeutectic alloy are commonly used to make pumps or compressor bodies.

As to claims 21 (examined as solidus temperature as explained in the 112, 2nd paragraph rejection in paragraph 6) through 23 and 25-26, Thieman et al disclose the claimed invention above, but fail to teach a first temperature about 10 to 15 degrees C above the *solidus temperature*, the range of the first temperature being between 585-595 degrees C, and the indexing time between 0.5 to 30 seconds.

However, Bersgman discloses casting an AA 356 by superheating to 588 degrees C, which is approximately 12 degrees C above the solidus temperature and were held for 5 seconds (col. 13, lines 39-64, col. 14, line 18) for the purpose of an effective transformation from a dendritic grain structure to a globular or spheriodal microstructure.

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to combine the superheating method at 588 degrees C, above 12 degrees C from the solidus temperature, and hold for 30 seconds as index time as taught by Bersgman, with Thieman et al in order to have an effective transformation from a dendritic to a globular microstructure.

13. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over "SLC, A Novel New and Economical Approach to Semi Solid Metal (SSM) Casting)" Thieman et al as applied to claim 1 above, and further in view of Applicant's admitted prior art, page 5, last paragraph through page 6, first paragraph.

Thieman et al disclose using a 100 Ton machine which has an equivalent shot capability of a much larger conventional machine, but do not explicitly disclose using a 1000 Ton machine.

However, applicant's admitted prior art in page 5, last paragraph to page 6, first paragraph, in the specification, indicates that 100 Ton machine is capable of performing the same task as the 1000 Ton shuttle machine, capable of performing at higher speed with shorter time.

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Therefore, it would have been obvious to an ordinary skill in the art to use these press machines interchangeably as taught by applicant's admitted prior art, with Thieman et al since they both are functionally equivalent.

Allowable Subject Matter

14. Claim 24 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior arts of record fail to teach zero index time.

Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Len Tran whose telephone number is (571) 272-1184. The examiner can normally be reached on M-F, 8:30 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Len Tran
Examiner
Art Unit 1725



LT
September 10, 2004